10/630,693

WHAT WE CLAIM IS:

1. A zoom lens comprising, in order from an object side thereof, a lens group A that includes a negative lens and a reflecting optical element for bending an optical path and remains fixed upon zooming, a lens group B that moves in one direction alone upon zooming from a wide-angle end to a telephoto end of the zoom lens, and an aperture stop that remains immovable with respect to position upon zooming, wherein condition (1) is satisfied:

$$0.45<\log \gamma_B/\log \gamma<0.85 \quad \ldots (1)$$

where $\gamma=f_T/f_W$, and γ_B is a magnification of the lens group B at the telephoto end/a magnification of the lens group B at the wide-angle end, provided that f_W and f_T are focal lengths of the zoom lens at the wide-angle end and the telephoto end, respectively.

2. The zoom lens according to claim 1, wherein the lens group A comprises a negative lens on the object side with respect to the reflecting optical element.

3. The zoom lens according to claim 1, which further comprises a lens group on an image side of the zoom lens with respect to the aperture stop that, upon zooming from the wide-angle end to the telephoto end, moves in one direction alone.

4. A zoom lens comprising, in order from an object side thereof, a lens group A that has negative refracting power and remains fixed upon zooming, a lens

group B that has positive refracting power and moves upon zooming, and an aperture stop that remains immovable with respect to position upon zooming, wherein condition (1) is satisfied:

$$0.45<\log \gamma_B/\log \gamma<0.85 \quad \ldots (1)$$

where $\gamma=f_T/f_W$, and γ_B is a magnification of the lens group B at a telephoto end/a magnification of the lens group B at a wide-angle end, provided that f_W and f_T are focal lengths of the zoom lens at the wide-angle end and the telephoto end, respectively.

5. The zoom lens according to claim 4, which further comprises a lens group C having negative refracting power and a lens group D having positive refracting power in order from the aperture stop toward an image side of the zoom lens, wherein, upon zooming from a wide-angle end to a telephoto end of the zoom lens, at least one lens group moves toward only an image side of the zoom lens.

6. The zoom lens according to claim 4, wherein the lens group A further comprises a reflecting optical element for bending an optical path, and the lens group B moves toward the object side alone upon zooming from the wide-angle end to the telephoto end.

7. The zoom lens according to claim 1 or 4, wherein the lens group A comprises a subgroup A1 comprising a negative meniscus lens convex on an object side thereof, a reflecting optical element for bending an

optical path and a subgroup A2 comprising at least positive lens.

8. The zoom lens according to claim 1 or 4, which further comprises lens groups on an image side of the zoom lens with respect to the aperture stop, wherein focusing is performed with any of the lens groups located on the image side.

9. The zoom lens according to claim 1 or 4, which further comprises lens groups having positive refracting power, all of which have aspheric surfaces.

10. The zoom lens according to claim 1 or 4, which further comprises lens groups having positive refracting power, all of which include cemented lens components.

11. The zoom lens according to claim 1 or 4, which further comprises lens group having positive refracting power, which are each formed of one cemented lens component.

12. The zoom lens according to claim 1 or 4, wherein the reflecting optical element for bending an optical path is formed of a prism block that satisfies the following medium condition:

$$1.55<n_{pri}<1.97 \quad \ldots (2)$$

where n_{pri} is a d-line refractive index of a medium that forms the prism block.

13. The zoom lens according to claim 12, wherein the prism block satisfies the following condition:

$$0.5<d/L<1.2 \quad \ldots (3)$$

where d is a distance from an entrance surface to an exit surface of the prism block as measured along the optical path and calculated on an air basis, and L is a diagonal length of an effective image pickup area of an image pickup device.

14. The zoom lens according to claim 4, wherein a composite magnification of the lens group B and subsequent lens groups at the telephoto end satisfies the following condition:

$$0.75<-\beta_{Rt}<1.5 \quad \ldots (4)$$

where β_{Rt} is a composite magnification (on an infinite object point) of the lens group B and the subsequent lens groups.

15. The zoom lens according to claim 5, wherein amounts of movement of lens groups upon zooming from the wide-angle end to the telephoto end when focused at infinity satisfies the following condition:

$$-1.0<M_3/M_2<-0.3 \quad \ldots (5)$$

where M_2 is an amount of movement of the lens group B and M_3 is an amount of the lens group C.

16. The zoom lens according to claim 5, wherein amounts of movement of lens groups upon zooming from the wide-angle end to the telephoto end when focused at infinity satisfies the following condition:

$$0.3<M_4/M_3<0.9 \quad \ldots (6)$$

where M_3 is an amount of movement of the lens group C and M_4 is an amount of the lens group D.

17. The zoom lens according to claim 7, wherein the subgroup A2 in the lens group A consists of two lens components, i.e., a positive lens component and a negative lens component in order from the object side, and satisfies the following condition:

$$-0.3<L/f_{12}<0 \quad \ldots (7)$$

where f_{12} is a focal length of the subgroup A2 in the lens group A and L is a diagonal length of an effective image pickup area of an image pickup device.

18. The zoom lens according to claim 7, wherein the lens group A satisfies the following conditions:

$$0.5<(R_{11F}+F_{11R})/(R_{11F}-R_{11R})<4.5 \quad \ldots (8)$$

$$0<f_{11}/f_{12}<0.8 \quad \ldots (9)$$

where R_{11F} and R_{11R} are axial radii of curvature of an object side-surface and an image side-surface of the negative lens in the subgroups A1 in the lens group A, respectively, and f_{11} and f_{12} are focal lengths of the subgroups A1 and A2 in the lens group A, respectively.

19. The zoom lens according to claim 1 or 6, wherein the reflecting optical element for bending an optical path comprises a variable-shape mirror with controllable shape.

20. An electronic imaging system comprising a zoom lens as recited in claim 1 or 4 and an electronic image pickup device located on an image side thereof.